

CLAIMS:

1. An OLED device having at least one pixel, comprising:
 - a planar light coupling layer having a front surface and a back surface, said layer having a thickness T ;
 - a light emitting portion for each pixel, disposed on the back surface of the light coupling layer; and
 - a microlens for each pixel, having a radius of curvature R , disposed on the front surface of the light coupling layer such that its centre of curvature is within the light coupling layer,
wherein the radius of curvature R and the thickness T are such that $R = xT$, where x has a value in the range from 0.2 to 0.8.
2. An OLED device according to claim 1, being a bottom emitter in which the light coupling layer is a planar substrate, and comprising:
 - a planar substrate having a front surface and a back surface, said substrate having a substrate thickness T ;
 - a light emitting portion for each pixel, disposed on the back surface of the substrate; and
 - a microlens for each pixel, having a radius of curvature R , disposed on the front surface of the substrate such that its centre of curvature is within the substrate,
wherein the radius of curvature R and the substrate thickness T are such that $R = xT$, where x has a value in the range from 0.2 to 0.8.
3. An OLED device according to claim 1, being a top emitter in which the light coupling layer is an encapsulating layer, and comprising:
 - a planar substrate having a front surface and a back surface;
 - a light emitting portion for each pixel, disposed on the front surface of the substrate;
 - an encapsulating layer disposed over the light emitting portion and on the front surface of the substrate, the encapsulating layer having a front surface and a back surface, said encapsulating layer having an encapsulant thickness T ; and

a microlens for each pixel, having a radius of curvature R , disposed on the front surface of the encapsulating layer such that its centre of curvature is within the encapsulating layer,
wherein the radius of curvature R and the encapsulant thickness T are such that $R = xT$,
where x has a value in the range from 0.2 to 0.8.

4. An OLED device according to any preceding claim, wherein the microlens is centred over the light emitting portion.
5. An OLED device according to any preceding claim, wherein x is in the range from 0.4 to 0.6.
6. An OLED device according to claim 5, wherein x is in the range from 0.45 to 0.6.
7. An OLED device according to claim 6, wherein x is in the range from 0.47 to 0.55.
8. An OLED device according to claim 7, wherein x is in the range from 0.49 to 0.55.
9. An OLED device according to claim 8, wherein x is 0.5.
10. An OLED device according to any of claims 1 to 9, wherein the microlens is a planoconvex lens.
11. An OLED device according to any of claims 1 to 9, wherein the microlens is a Fresnel lens.
12. An OLED device according to any preceding claim, wherein the light coupling layer is of a material having a refractive index in the range from 1.40 to 1.60.

13. An OLED device according to any preceding claim, wherein the microlens is of a material having a refractive index in the range from 1.40 to 1.60.
14. An OLED device according to any preceding claim, wherein the material of the light coupling layer or of the microlens, or of both, is glass or polycarbonate.
15. An OLED device according to claim 14, wherein the material is glass having a refractive index in the range from 1.49 to 1.53.
16. An OLED device according to any preceding claim, wherein the light coupling layer defines an array of pixels having a pixel pitch P , and each microlens is disposed on the front surface of the light coupling layer such that its centre of curvature within the light coupling layer is at, or at a distance D from, the front surface of the light coupling layer such that $D = zT$ wherein $D = R\sqrt{1-1/(2y^2)}$; y is defined by R/P ; and $z = 0.2-0.8$.
17. An OLED device according to claim 16, wherein the thickness T and the pixel pitch P are such that $T = aP$, where a has a value in the range from 0.4 to 2.5.
18. An OLED device according to claim 17, wherein the pixel pitch P is in the range from 0.2 to 0.4 mm and the thickness T is in the range from 0.3 to 1.0 mm.